CLAIMS

1. A spectrometering apparatus comprising:

a chamber that is evacuated to achieve a vacuum state and includes a light transmission window;

a generator that generates measuring light;

an illumination optical system that guides the measuring light onto a specimen;

a detector that detects specimen light from the specimen; and

a detection optical system that guides the specimen light from the specimen irradiated with the measuring light to the detector, wherein:

the generator, the illumination optical system, the detector and the detection optical system are disposed inside the evacuated chamber; and

the specimen is placed outside the evacuated chamber.

2. A spectrometering apparatus comprising:

a chamber that is evacuated to achieve a vacuum state and includes a light transmission window;

a generator that generates terahertz pulse light;

an illumination optical system that guides the terahertz pulse light onto a specimen;

a detector that detects specimen light from the specimen; and

a detection optical system that guides the specimen light from the specimen irradiated with the terahertz pulse light to the detector, wherein:

the generator, the illumination optical system, the detector and the detection optical system are disposed inside the evacuated chamber; and

the specimen is placed outside the evacuated chamber.

3. A spectrometering apparatus according to claim 2, wherein:

the transmission window is constituted of a polyethylene or quartz.

4. A spectrometering apparatus according to claim 2 or claim 3, further comprising:

a laser light source that generates laser pulse light;

a splitter that splits the laser pulse light generated by the laser light source into pump light to be guided to the generator and probe light to be guided to the detector; and

an optical path length altering device that alters an optical path length of the pump light guided to the generator and/or an optical path length of the probe light guided to the detector, wherein:

the detector samples the specimen light from the specimen entering via the transmission window in

synchronization with an irradiation timing of the pump light and/or the probe light; and

a distance between the transmission window and the specimen is set larger than an optical path length altering range of the optical path length altering device.

5. A spectrometering apparatus according to claim 4, wherein:

the laser light source, the splitter and the optical path length altering device are disposed outside the chamber.

6. A spectrometering apparatus according to claim 2 or claim 3, further comprising:

a laser light source that generates laser pulse light;

a splitter that splits the laser pulse light generated by the laser light source into pump light to be guided to the generator and probe light to be guided to the detector; and

an optical path length altering device that alters an optical path length of the pump light guided to the generator and/or an optical path length of the probe light guided to the detector, wherein:

the detector samples the specimen light from the specimen entering via the transmission window in synchronization with an irradiation timing of the pump light and/or the probe light; and

the spectrometering apparatus further includes a processing circuit that separates and removes a signal attributable to reflected light resulting from reflection at the transmission window from a detection signal input thereto from the detector.

7. A spectrometering apparatus according to claim 2 or claim 3, further comprising:

a laser light source that generates laser pulse light;

a splitter that splits the laser pulse light generated by the laser light source into pump light to be guided to the generator and probe light to be guided to the detector; and

an optical path length altering device that alters an optical path length of the pump light guided to the generator and/or an optical path length of the probe light guided to the detector, wherein:

the detector samples the specimen light from the specimen entering via the transmission window in synchronization with an irradiation timing of the pump light and the probe light; and

the spectrometering apparatus further includes a processing circuit that separates and removes a signal attributable to multiply reflected light resulting from multiple reflection occurring between the specimen and the

transmission window from a detection signal input thereto from the detector.

8. A spectrometering apparatus comprising:

a chamber that has a light transmission window and is purged with gas which does not absorb terahertz pulse light;

a generator that generates terahertz pulse light;

an illumination optical system that guides the terahertz pulse light onto a specimen;

a detector that detects specimen light from the specimen; and

a detection optical system that guides the specimen light from the specimen irradiated with the terahertz pulse light to the detector, wherein:

the generator, the illumination optical system, the detector and the detection optical system are disposed inside the chamber; and

the specimen is placed outside the chamber.

9. A spectrometering apparatus according to claim 2 or claim 8, wherein:

a fluid tank, formed so as to allow the specimen to be immersed therein in a fluid with a small absorption coefficient for terahertz light and allow the fluid to be in

contact with an outer surface of the transmission window, is disposed outside the chamber;

the illumination optical system guides the terahertz pulse light onto the specimen via the transmission window and the fluid inside the fluid tank; and

the detector receives the specimen light via the fluid inside the fluid tank and the transmission window.

10. A spectrometering apparatus according to claim 2 or claim 8, further comprising:

a gas jet device that replaces atmosphere in a space between the transmission window and the specimen with gas that does not absorb the terahertz pulse light by supplying the gas into the space between the transmission window and the specimen.

11. A spectrometering apparatus according to claim 1 or claim 2, further comprising:

a holder that holds the specimen outside the chamber;

a base disposed within the chamber, to which the generator and the detector are fixed; and

a connecting member that displaceably passes through a barrier wall of the chamber with airtight sealing and connects the base and the holder so as to fix positions thereof relative to each other.

12. A spectrometering apparatus comprising:

a first vacuum chamber and a second vacuum chamber separated from each other by a barrier wall having a light transmission window;

a holder disposed in the first vacuum chamber, which holds a specimen;

a light radiation unit disposed inside the second vacuum chamber, which guides measuring light onto the specimen in the first vacuum chamber via the light transmission window;

a light detection unit disposed in the second vacuum chamber, which receives specimen light from the specimen irradiated with the measuring light via the light transmission window;

a base disposed in the second vacuum chamber, to which the light radiation unit and the light detection units are fixed; and

a connecting member that displaceably passes through barrier wall with airtight sealing and connects the base and the holder so as to fix positions thereof relative to each other.

13. A spectrometering apparatus according to claim 11 or claim 12, wherein:

the connecting member includes a number of rod-like members disposed substantially parallel to a virtual centerline and set over distances substantially equal to one another from the centerline around the centerline over substantially uniform angular intervals.

14. A spectrometering apparatus according to claim 11 or claim 12, wherein:

a peripheral wall portion of the chamber is formed in a cylindrical shape.